

Name:

SOLUTIONS

Quiz #12 - December 8, 2006

1. Evaluate

$$\int_0^{13} \frac{dx}{\sqrt[3]{(1+2x)^2}} \quad u=1+2x \quad du=2dx$$

$$= \int_1^{27} \frac{1}{2} u^{-2/3} du = \frac{3}{2} u^{1/3} \Big|_1^{27} = \frac{3}{2} (3-1) = \boxed{3}$$

2. Find the average value of the function  $h(x) = \cos^4 x \sin x$  on the interval  $[0, \pi]$ .

$$\int_0^{\pi} \cos^4 x \sin x dx \quad u = \cos x \quad du = -\sin x dx$$
$$= \int_1^{-1} -u^4 du = -\frac{u^5}{5} \Big|_1^{-1} = \frac{1}{5} - \left(-\frac{1}{5}\right) = \frac{2}{5}$$

so

$$f_{\text{ave}} = \frac{2/5}{\pi-0} = \boxed{\frac{2}{5\pi}}$$

3. Find  $g'(x)$ :

$$g(x) = \int_0^x \sqrt{1+2t} dt.$$

$$\boxed{1+2x}$$